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Lichenized and lichenicolous fungi from nine different areas in Turkey

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Abstract — A contribution to the lichen flora of Turkey is presented. The taxonomic survey of Ankara, Erzurum, Hatay, Ordu, Siirt, Uşak regions, and Kınalıada, Heybeliada and Marmara islands yields a total of 297 lichenized and 14 lichenicolous fungi representing 93 genera in the *Ascomycota. Aspicilia moenium, Lecanora albellula, Pertusaria pupillaris, Porina aenea,* and *Rinodina fatiscens* are new to Turkey. Distribution and substrata are cited in the complete annotated list, which can be downloaded from http://www.mycotaxon.com/resources/weblists.html.

Keywords — *Ascomycetes*, biodiversity, lichens

Introduction

In recent years there has been an increasing number of studies on the lichen flora of Turkey (Aptroot & Yazici 2009, Candan & Özdemir Türk 2008, Yazici & Aptroot 2008, Yazici & Aslan 2009). However, compared to other countries, many regions of Turkey remain unexplored. Although recent lichenological research has been conducted for Ankara, Erzurum, Hatay, Ordu and Uşak regions, and Kınalıada and Heybeliada islands (Aslan 2000, Çobanoğlu & Akdemir 1997, John 2002, John et al. 2000, John & Nimis 1998, Kinalioglu

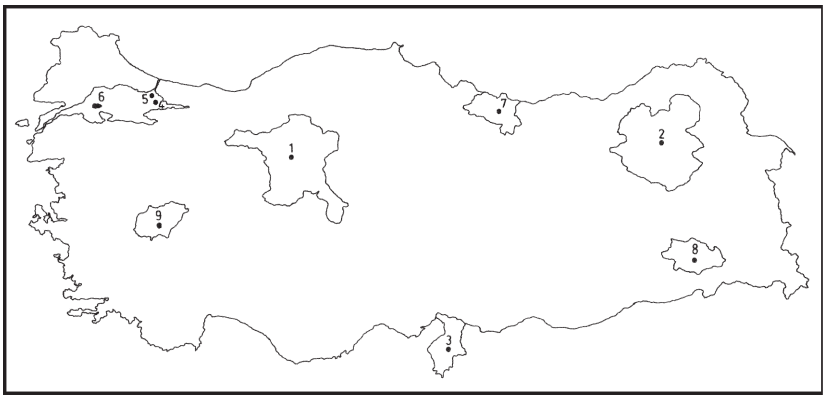

Figure 1. Map of Turkey showing the nine areas surveyed in this paper. 1: Ankara, 2: Erzurum, 3: Hatay, 4: Heybeliada, 5: Kınalıada, 6: Marmara Island, 7: Ordu, 8: Siirt, 9: Uşak

2008), no lichens and lichenicolous fungi have thus far been reported for Siirt region and Marmara island. The present paper adds further information to our knowledge of the lichen flora of Turkey.

Material and methods

The lichen samples were collected in 40 different localities from 16 April 2007 to 21 March 2009. The study area consists of Ankara, Erzurum, Hatay, Ordu and Uşak regions, and Kınalıada and Heybeliada islands of Turkey (Fig. 1). Air-dried samples were studied with a Nikon SMZ1500 stereomicroscope and a Nikon Eclipse 80i light microscope with standard identification methods for lichenized and lichenicolous fungi (Etayo & Sancho 2008, Poelt 1969, Purvis et al 1992, Wirth 1995). Vouchers are deposited in the herbarium of Biology Department, Faculty of Science, Karadeniz Technical University, Turkey (KTUB).

Ankara is mostly surrounded mostly by steppe vegetation and has a harsh dry continental climate with cold, snowy winters and hot, dry summers.

Continental climate dominates in Erzurum with long and harsh winters, and short, mild summers. The average minimum temperature is -8.6°C, while the average high temperature is 19.6°C. Average annual precipitation is 453 mm. Steppe formations are prevalent.

In Uşak the Mediterranean climate is predominant and characterized by hot and dry summers and cold winters with much snowfall. Annual rainfall is 557 mm. The annual mean temperature is 12.5°C. *Quercus cerris*, *Q. infectoria*, *Pinus brutia,* and *P. sylvestris* are abundant trees.

Ordu is relatively dry, and has a Mediterranean climate. The flora mix with conifers that occur between the forests and platforms (Akman 1999, Baytop & Denizci 1963).

The Mediterranean climate prevails in Hatay. Winters are warm and rainy while summers are hot and dry. Annual average temperature is between16-21°C. Annual

average rainfall varies between the 570-1174 mm Natural flora consists of maquis and forests with deciduous trees (i.e. *Juniperus*, *Quercus*, *Betula*, *Populus*, *Platanus.*

Siirt region is well-forested and mountainous northeast of the city and gives way to a series of broad plateaus with steppe vegetation in the south. Terrestrial climate dominates in Siirt.

Kınalıada is the nearest island to the Asian side of Istanbul. The steppe is predominant. The annual average temperature fluctuates between 15–16°C. It has an intermediate climate. The highest annual average rainfall is in May (638.5 mm).

In Marmara Island *Pinus brutia* is predominantly seen from time to time while maquis is dominating in the south. The summers are dry and cool, the winters wet. Marmara has a mediterranean climate that is characterized by warm to hot summers (Akman 1999, Baytop & Denizci 1963).

Results

The taxonomic survey of Ankara, Erzurum, Hatay, Ordu, Siirt, Uşak regions, and Kınalıada, Heybeliada and Marmara islands yielded 297 lichenized and 14 lichenicolous fungi (i.e., 305 species, 4 subspecies, 2 varieties) representing 93 genera in the *Ascomycota.* Of these, 138 taxa were collected in Ankara, 156 in Hatay, 120 in Ordu, 111 in Uşak, 30 in Siirt, 49 in Erzurum regions, and 29 in Heybeli, 13 in Kınalıada, 64 in Marmara islands. *Aspicilia moenium, Lecanora albellula, Pertusaria pupillaris, Porina aenea,* and *Rinodina fatiscens* are new to Turkey. New records per province include 89 taxa from Ankara. Moreover, 94 taxa were reported as new from Ordu, 63 lichenized and 2 lichenicolous fungi from Uşak, 52 from Hatay, 22 from Erzurum, 27 from Heybeliada island, 11 from Kınalıada islands while all taxa identified are new for Siirt region (30 taxa) and Marmara island (64 taxa).

Discussion

Besides lichenicolous fungi (14 taxa), 178 species of the 297 taxa are crustose, 82 foliose, 34 fruticose, and 3 leprose. Further, 112 taxa were epiphytic only, 144 saxicolous, 20 terricolous, 12 epiphytic or saxicolous, 5 terricolous and muscicolous, and 21 muscicolous only. On the other hand, 8 taxa were defined parasitically growing on lichenized fungi. (of these 5 are strictly lichenicolous fungi). These are *Arthonia phaeophysciae, Buellia badia, Caloplaca aractina* (lichen), *Caloplaca grimmiae, Candelariella vitellina* (lichen), *Carbonea vitellinaria, Lecanora albescens* (lichen) and *Opegrapha glaucomaria. Caloplaca*, *Cladonia*, *Lecanora*, *Rinodina*, *Verrucaria* and *Xanthoparmelia* are the common genera in the area. Foliose genera such as *Flavoparmelia*, *Parmelia, Phaeophyscia*, *Physcia*, *Physconia*, *Melanelixia*, *Melanohalea*, *Peltigera, Xanthoparmelia* and *Xanthoria* were mostly found in Ankara, Hatay and Ordu regions. *Phaeophyscia*, *Physcia* and *Physconia* were mostly found in Ankara and Ordu especially on

deciduous trees. Saxicolous crustose lichens were found at all the stations and were very common, especially in the Ankara, Erzurum, and Siirt regions and on Marmara island. Crustose species were seen nearly at all stations and were very common on rock, limestone, and deciduous trees in Ankara, Hatay, Odu, Siirt, and Uşak. Foliose genera were mostly found in Ankara, Hatay, and Ordu. Fruticose taxa were mostly found in Ordu, Hatay, and Uşak.

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